FIG.1

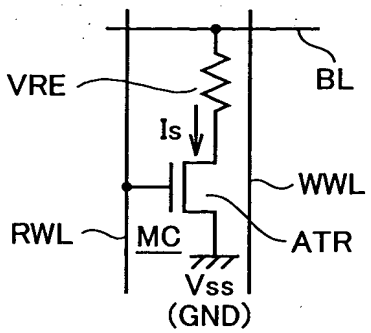

VRE
BL
Is
WWL
RWL
MC
ATR
Vss
(GND)

FIG.2

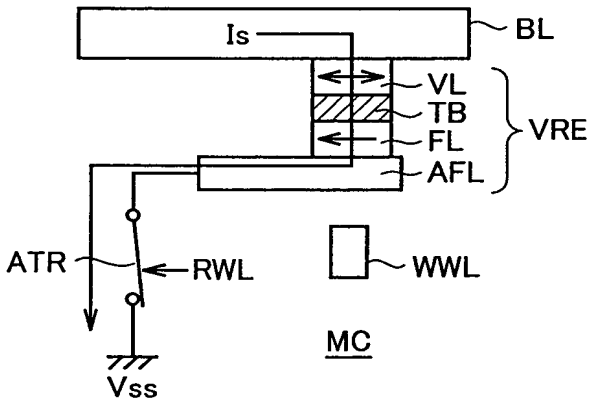

Is
BL
VL
TB
FL
AFL
VRE
ATR
RWL
WWL
MC
Vss

FIG.3

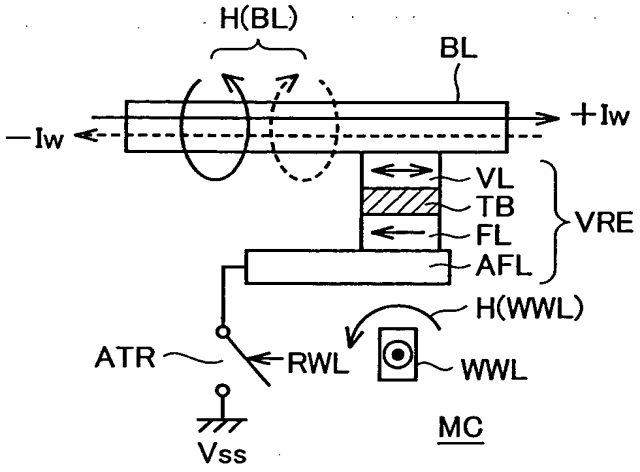

H(BL)
BL
−Iw
+Iw
VL
TB
FL
AFL
VRE
H(WWL)
ATR
RWL
WWL
MC
Vss

FIG.4

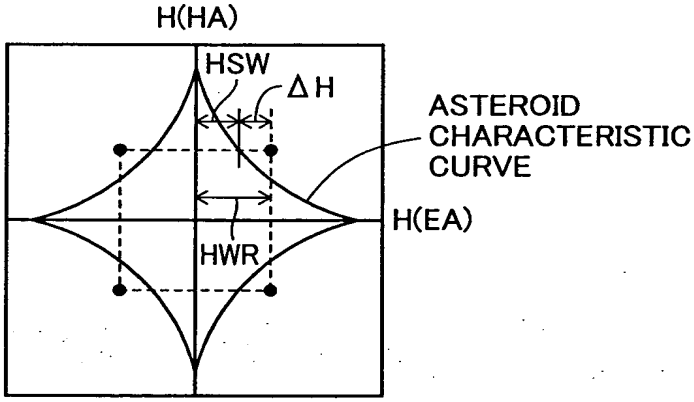

H(HA)
HSW
ΔH
ASTEROID
CHARACTERISTIC
CURVE
H(EA)
HWR

FIG.5

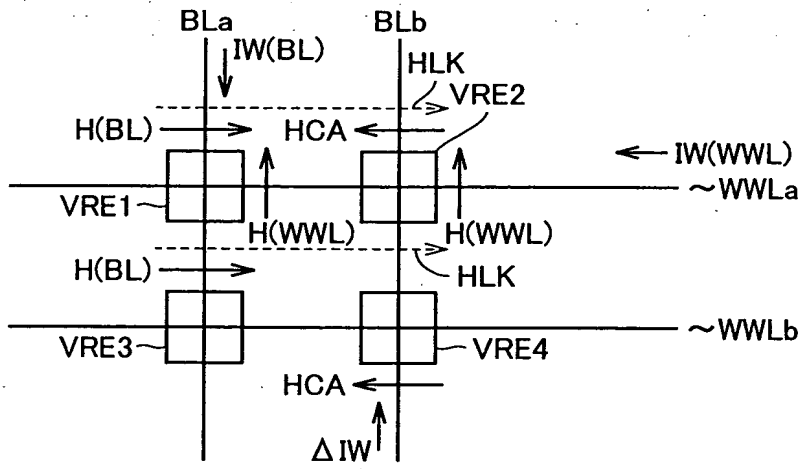

BLa
BLb
IW(BL)
HLK
VRE2
H(BL)
HCA
IW(WWL)
~WWLa
VRE1
H(WWL)
H(WWL)
H(BL)
HLK
~WWLb
VRE3
VRE4
HCA
ΔIW

FIG.6

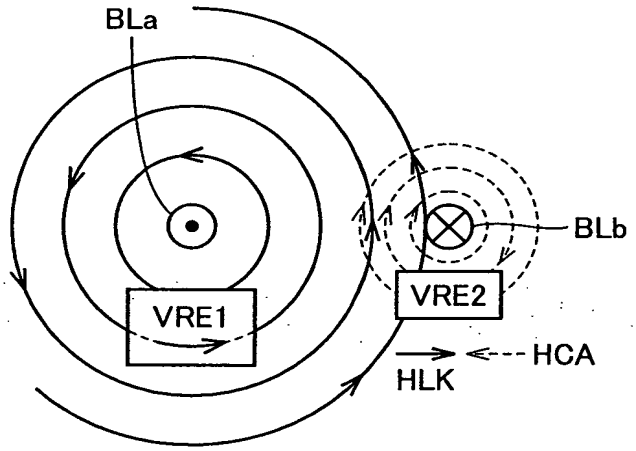

BLa
BLb
VRE1
VRE2
HCA
HLK

FIG.7

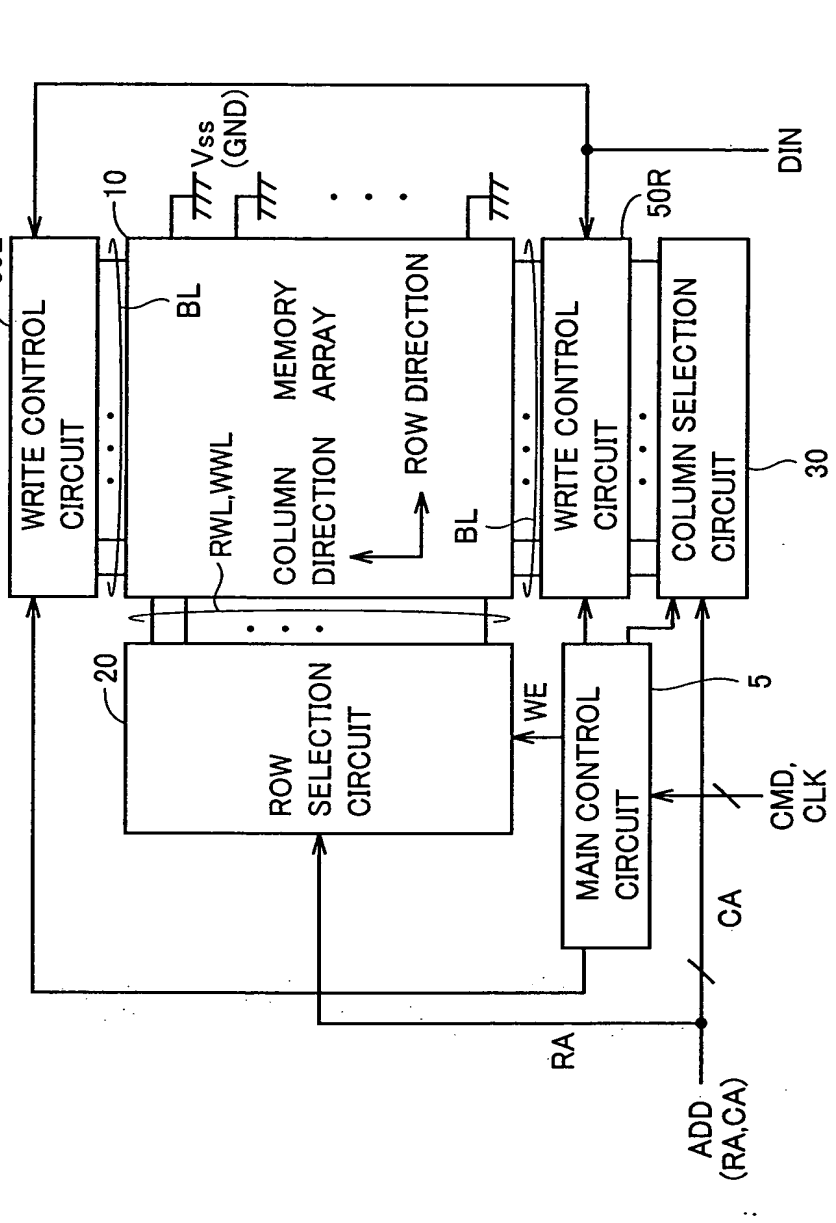

1
WRITE CONTROL CIRCUIT
50L
10
Vss (GND)
BL
MEMORY ARRAY
ROW DIRECTION
COLUMN DIRECTION
RWL,WWL
BL
WRITE CONTROL CIRCUIT
50R
DIN
COLUMN SELECTION CIRCUIT
30
20
ROW SELECTION CIRCUIT
WE
MAIN CONTROL CIRCUIT
5
CMD, CLK
CA
RA
ADD (RA,CA)

FIG.8

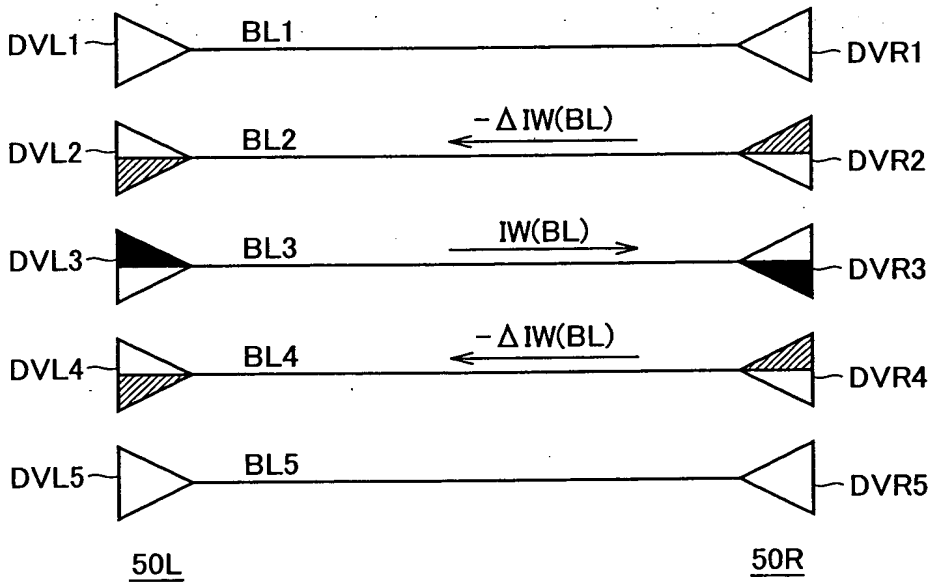

DVL1
BL1
DVR1
DVL2
BL2
−ΔIW(BL)
DVR2
DVL3
BL3
IW(BL)
DVR3
DVL4
BL4
−ΔIW(BL)
DVR4
DVL5
BL5
DVR5
50L
50R

FIG.9

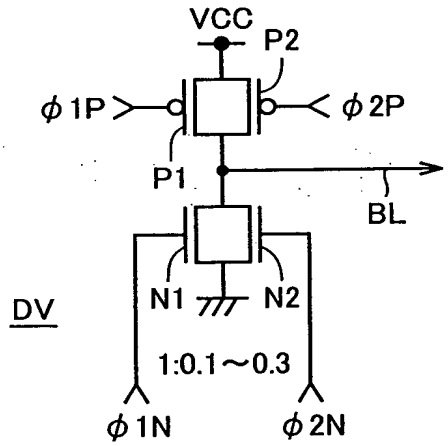

VCC
P2
φ1P
φ2P
P1
BL
DV
N1
N2
1:0.1～0.3
φ1N
φ2N

FIG.10

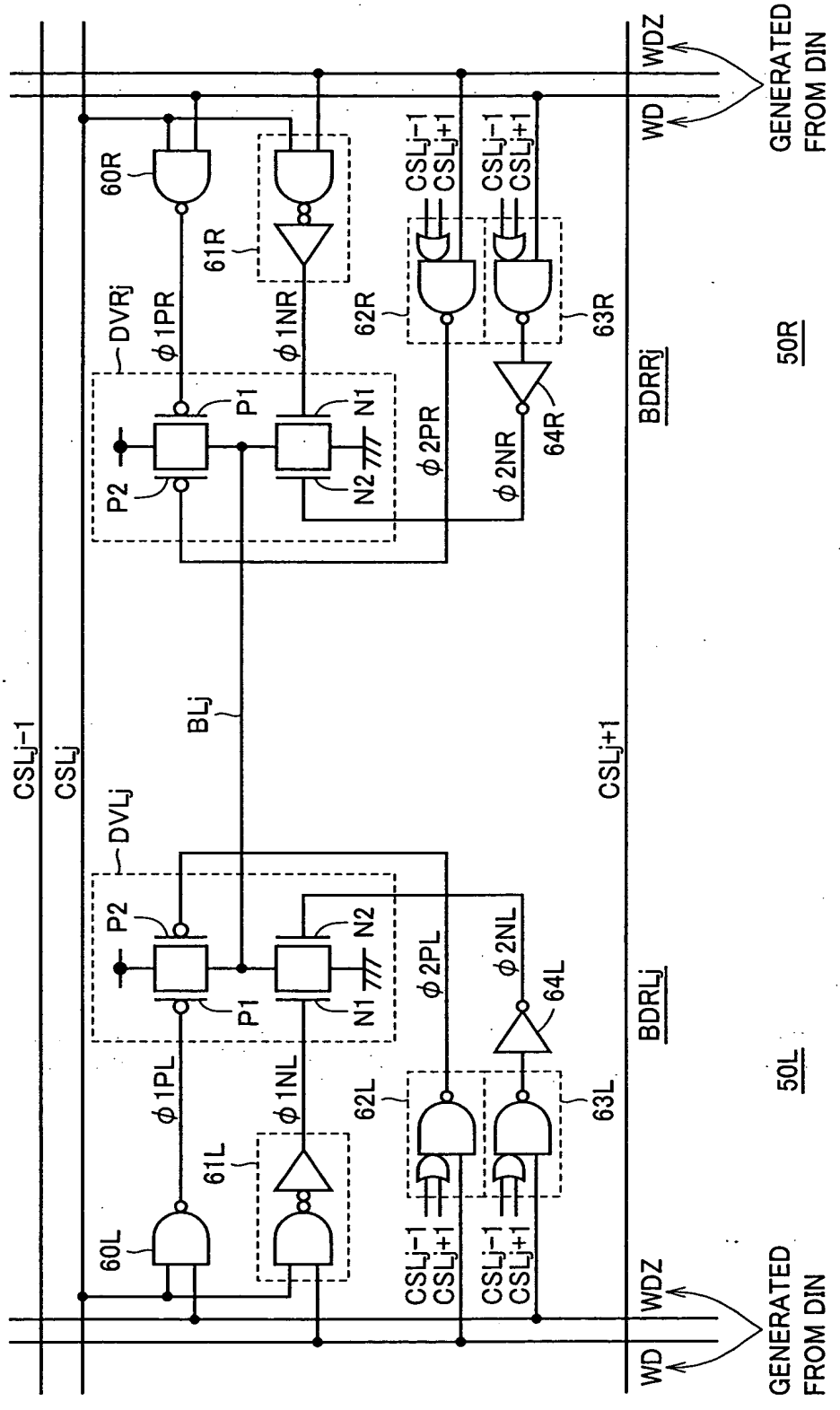

CSLj-1
CSLj
CSLj+1
BLj
DVLj
DVRj
60L
60R
61L
61R
62L
62R
63L
63R
64L
64R
φ1PL
φ1NL
φ1PR
φ1NR
φ2PL
φ2NL
φ2PR
φ2NR
P1
P2
N1
N2
CSLj-1
CSLj+1
WDZ
WD
GENERATED FROM DIN
BDRLj
BDRRj
50L
50R

FIG.11

		WD=H (WRITING OF "0")		WD=L (WRITING OF "1")	
	NOT SELECTED	BLj SELECTED	ADJACENT BL SELECTED	BLj SELECTED	ADJACENT BL SELECTED
ϕ1PL	H	H	H	L	H
ϕ1NL	L	H	L	L	L
ϕ2PL	H	H	L	H	H
ϕ2NL	L	L	L	L	H
ϕ1PR	H	L	H	H	H
ϕ1NR	L	L	L	H	L
ϕ2PR	H	H	H	H	L
ϕ2NR	L	L	H	L	L
CURRENT DIRECTION OF BLj	X	L←R	L→R	L→R	L←R

FIG.12

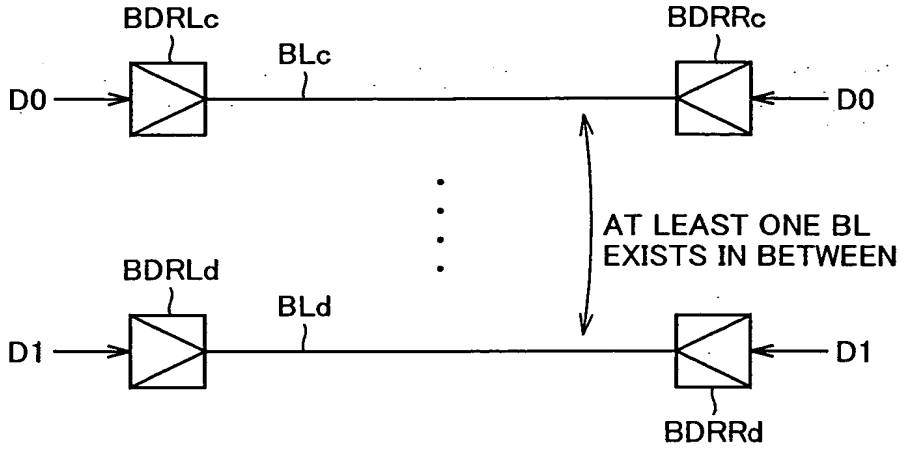

BDRLc
BLc
BDRRc
D0
D0
AT LEAST ONE BL
EXISTS IN BETWEEN
BDRLd
BLd
D1
D1
BDRRd

FIG.13

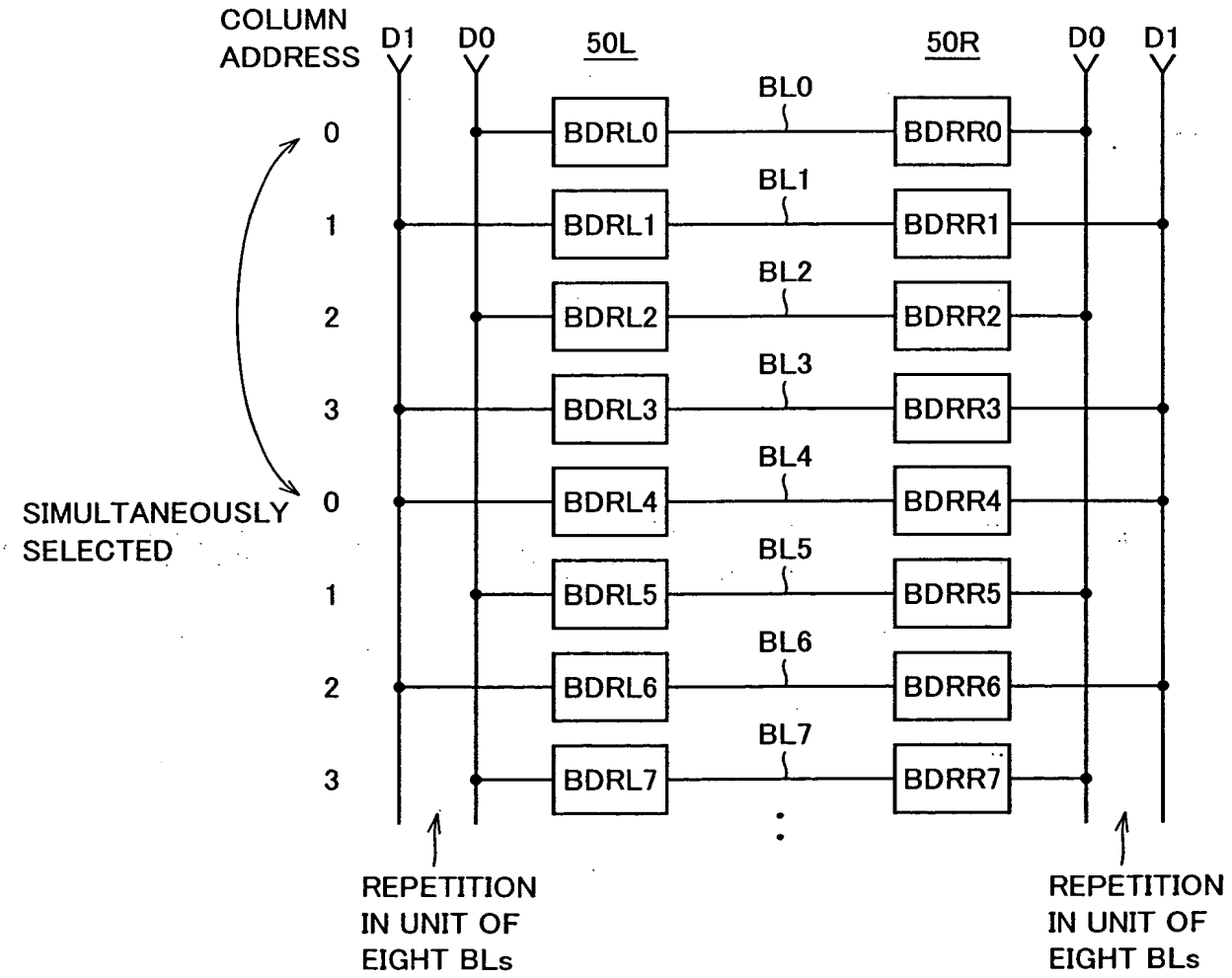

COLUMN
ADDRESS
D1
D0
50L
50R
D0
D1
BL0
BL1
BL2
BL3
BL4
BL5
BL6
BL7
BDRL0
BDRL1
BDRL2
BDRL3
BDRL4
BDRL5
BDRL6
BDRL7
BDRR0
BDRR1
BDRR2
BDRR3
BDRR4
BDRR5
BDRR6
BDRR7
0
1
2
3
0
1
2
3
SIMULTANEOUSLY
SELECTED
REPETITION
IN UNIT OF
EIGHT BLs
REPETITION
IN UNIT OF
EIGHT BLs

FIG.14

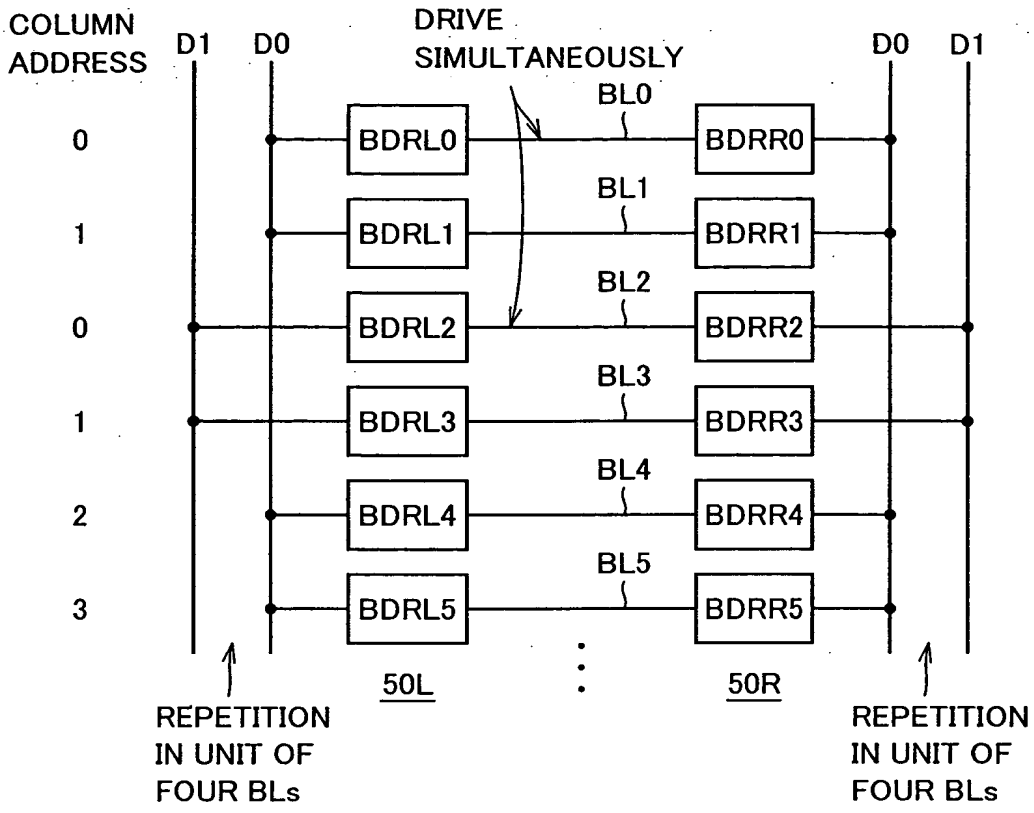

COLUMN ADDRESS
D1
D0
DRIVE SIMULTANEOUSLY
D0
D1
BL0
BL1
BL2
BL3
BL4
BL5
0
1
0
1
2
3
BDRL0
BDRL1
BDRL2
BDRL3
BDRL4
BDRL5
BDRR0
BDRR1
BDRR2
BDRR3
BDRR4
BDRR5
50L
50R
REPETITION IN UNIT OF FOUR BLs
REPETITION IN UNIT OF FOUR BLs

FIG.15

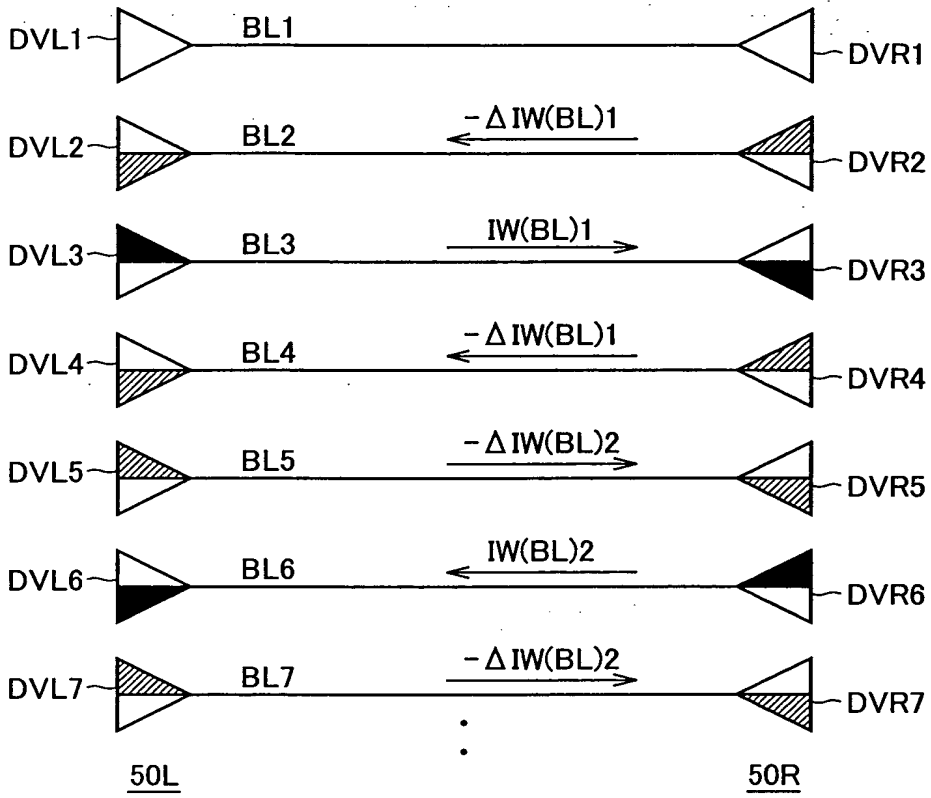

DVL1
BL1
DVR1
DVL2
BL2
-ΔIW(BL)1
DVR2
DVL3
BL3
IW(BL)1
DVR3
DVL4
BL4
-ΔIW(BL)1
DVR4
DVL5
BL5
-ΔIW(BL)2
DVR5
DVL6
BL6
IW(BL)2
DVR6
DVL7
BL7
-ΔIW(BL)2
DVR7
50L
50R

FIG.16

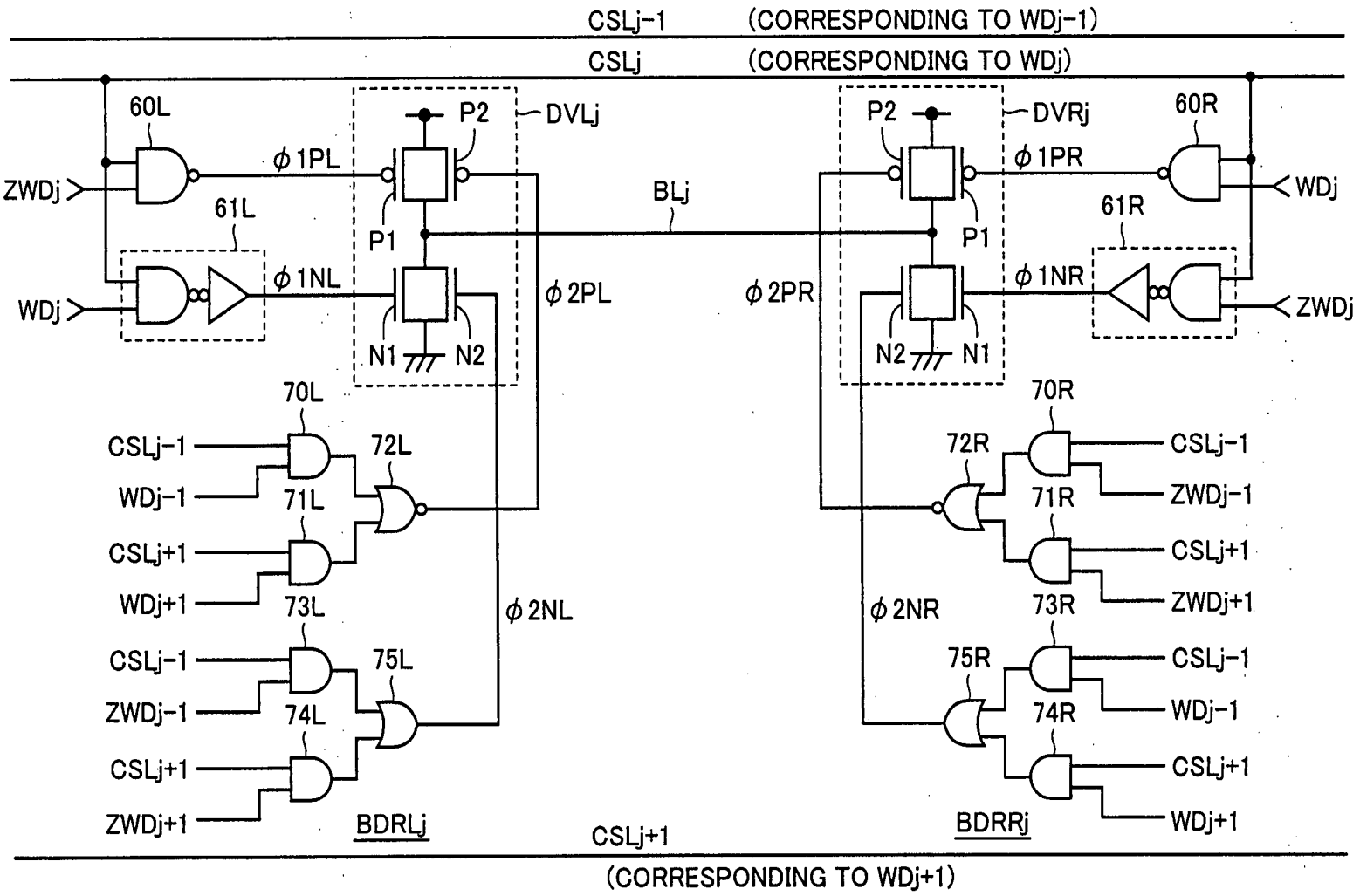

CSLj-1 (CORRESPONDING TO WDj-1)
CSLj (CORRESPONDING TO WDj)
60L
ZWDj
WDj
61L
φ1PL
φ1NL
P2
P1
N1
N2
DVLj
φ2PL
φ2NL
BLj
70L
CSLj-1
WDj-1
CSLj+1
WDj+1
72L
71L
73L
CSLj-1
ZWDj-1
CSLj+1
ZWDj+1
75L
74L
BDRLj
CSLj+1
(CORRESPONDING TO WDj+1)
P2
P1
N2
N1
DVRj
φ2PR
φ1PR
φ1NR
φ2NR
60R
WDj
61R
ZWDj
70R
72R
71R
73R
75R
74R
CSLj-1
ZWDj-1
CSLj+1
ZWDj+1
CSLj-1
WDj-1
CSLj+1
WDj+1
BDRRj

FIG.17

	NOT SELECTED	SELECTED CSLj-1		SELECTED CSLj+1	
		WDj-1 =H	WDj-1 =L	WDj+1 =H	WDj+1 =L
ϕ2PL	H	L	H	L	H
ϕ2NL	L	L	H	L	H
ϕ2PR	H	H	L	H	L
ϕ2NR	L	H	L	H	L
CURRENT DIRECTION OF BLj	X	L→R	L←R	L→R	L←R

FIG.18

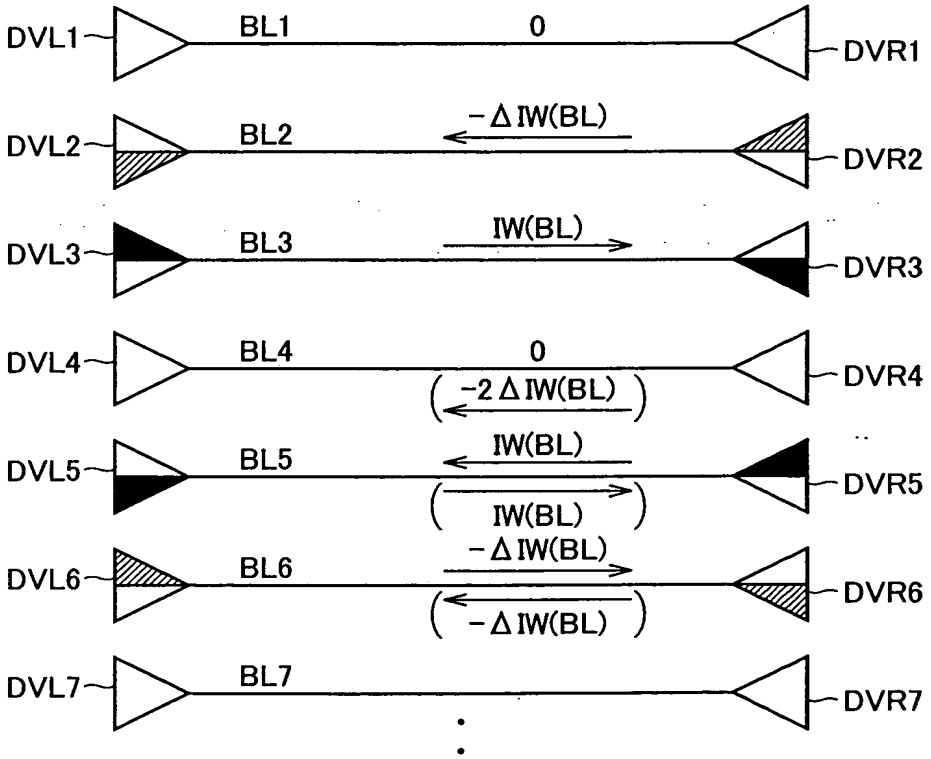


FIG.19

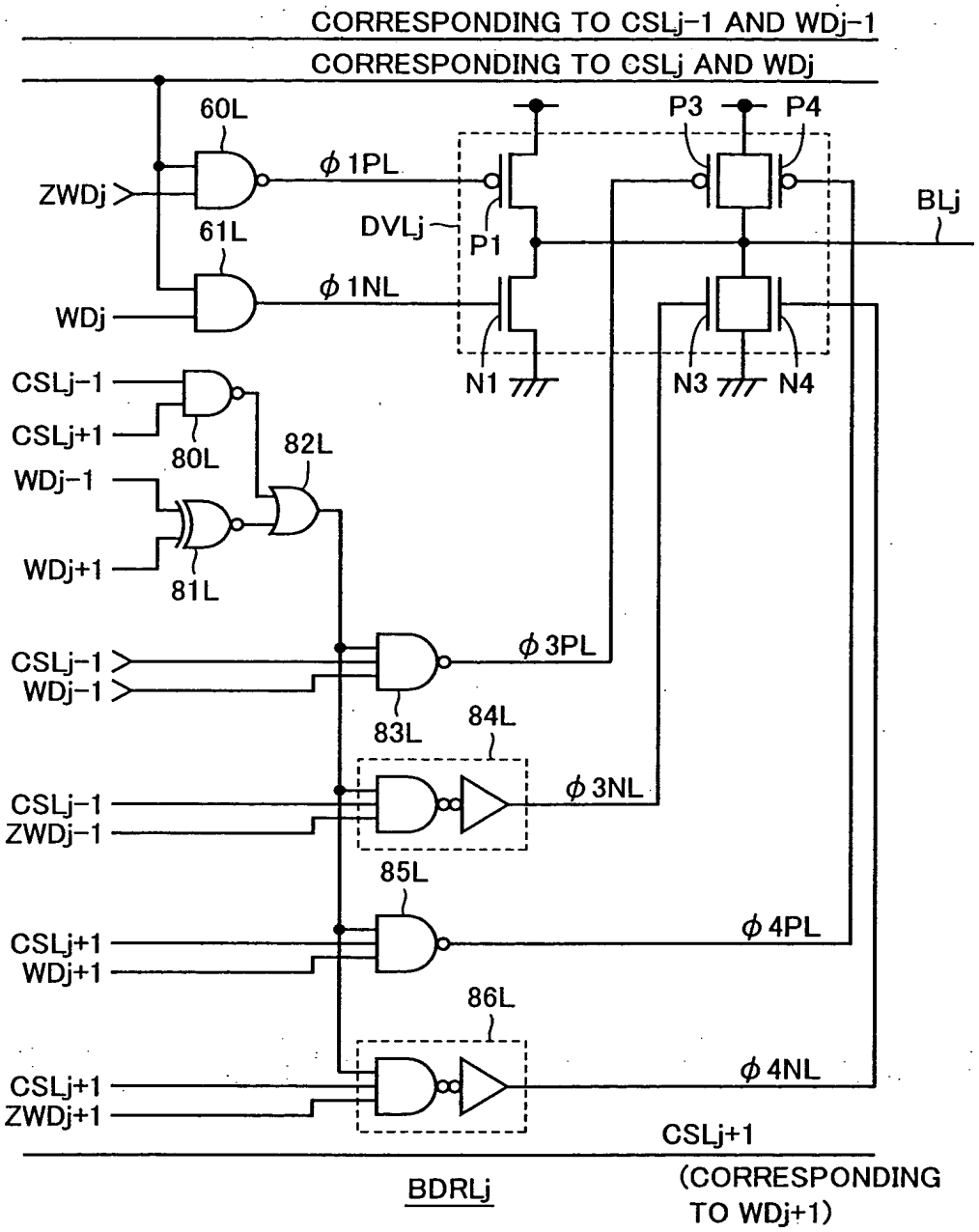

CORRESPONDING TO CSLj-1 AND WDj-1
CORRESPONDING TO CSLj AND WDj
60L
ZWDj
61L
WDj
φ1PL
φ1NL
DVLj
P1
P3
P4
BLj
N1
N3
N4
CSLj-1
CSLj+1
80L
82L
WDj-1
WDj+1
81L
CSLj-1
WDj-1
φ3PL
83L
84L
φ3NL
CSLj-1
ZWDj-1
85L
φ4PL
CSLj+1
WDj+1
86L
φ4NL
CSLj+1
ZWDj+1
CSLj+1
(CORRESPONDING TO WDj+1)
BDRLj

FIG.20

CSLj-1	CSLj+1	WDj-1	WDj+1	ϕ3PL	ϕ3NL	ϕ4PL	ϕ4NL	BLj CURRENT
L	L	-	-	H	L	H	L	0
L	H	-	H	H	L	L	L	$\Delta IW \rightarrow$
L	H	-	L	H	L	H	H	$\Delta IW \leftarrow$
H	L	L	-	H	H	H	L	$\Delta IW \leftarrow$
H	L	H	-	L	L	H	L	$\Delta IW \rightarrow$
H	H	L	L	H	H	H	H	$2 \cdot \Delta IW \leftarrow$
H	H	L	H	H	L	H	L	0
H	H	H	L	H	L	H	L	0
H	H	H	H	L	L	L	L	$2 \cdot \Delta IW \rightarrow$

FIG.21

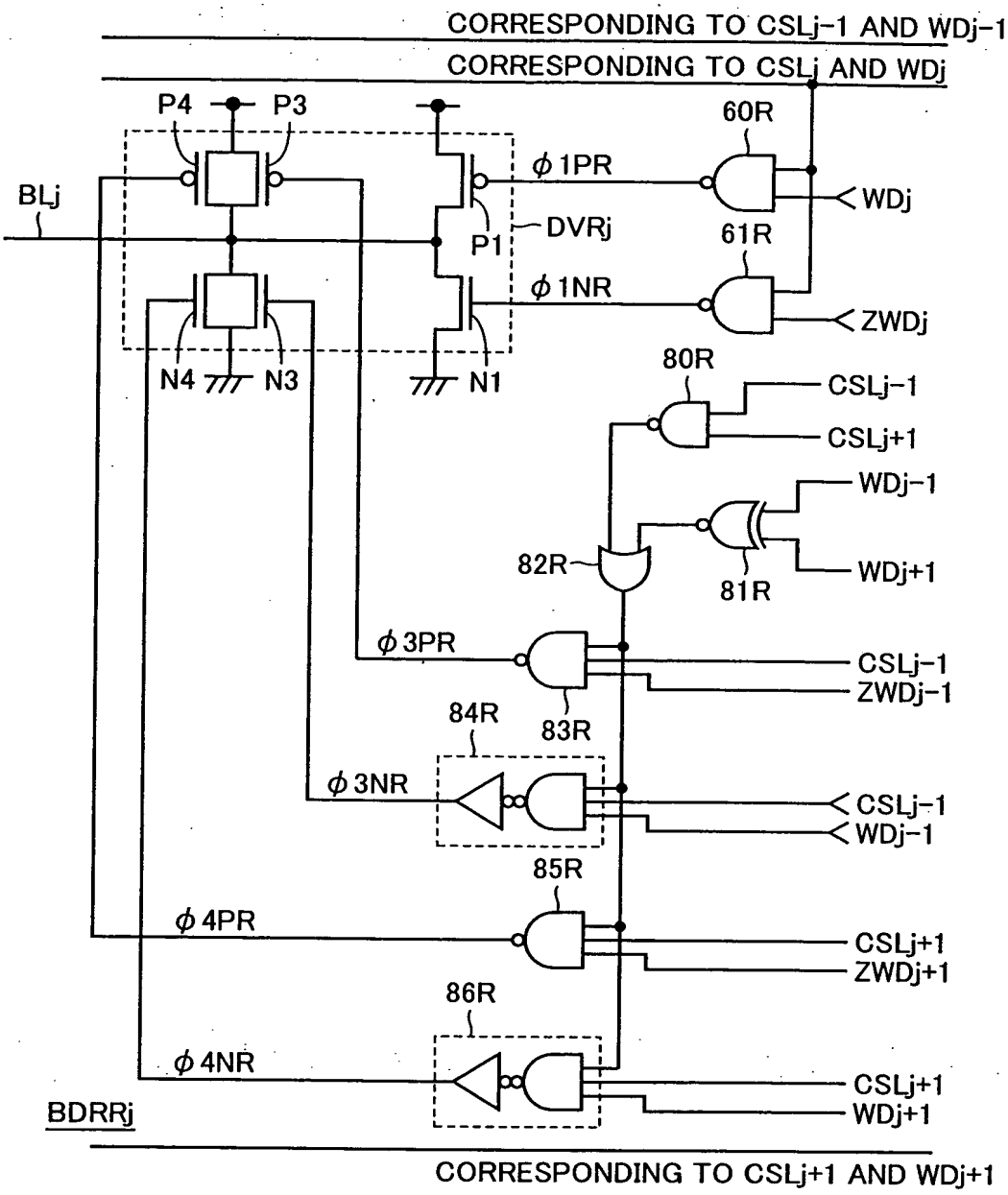
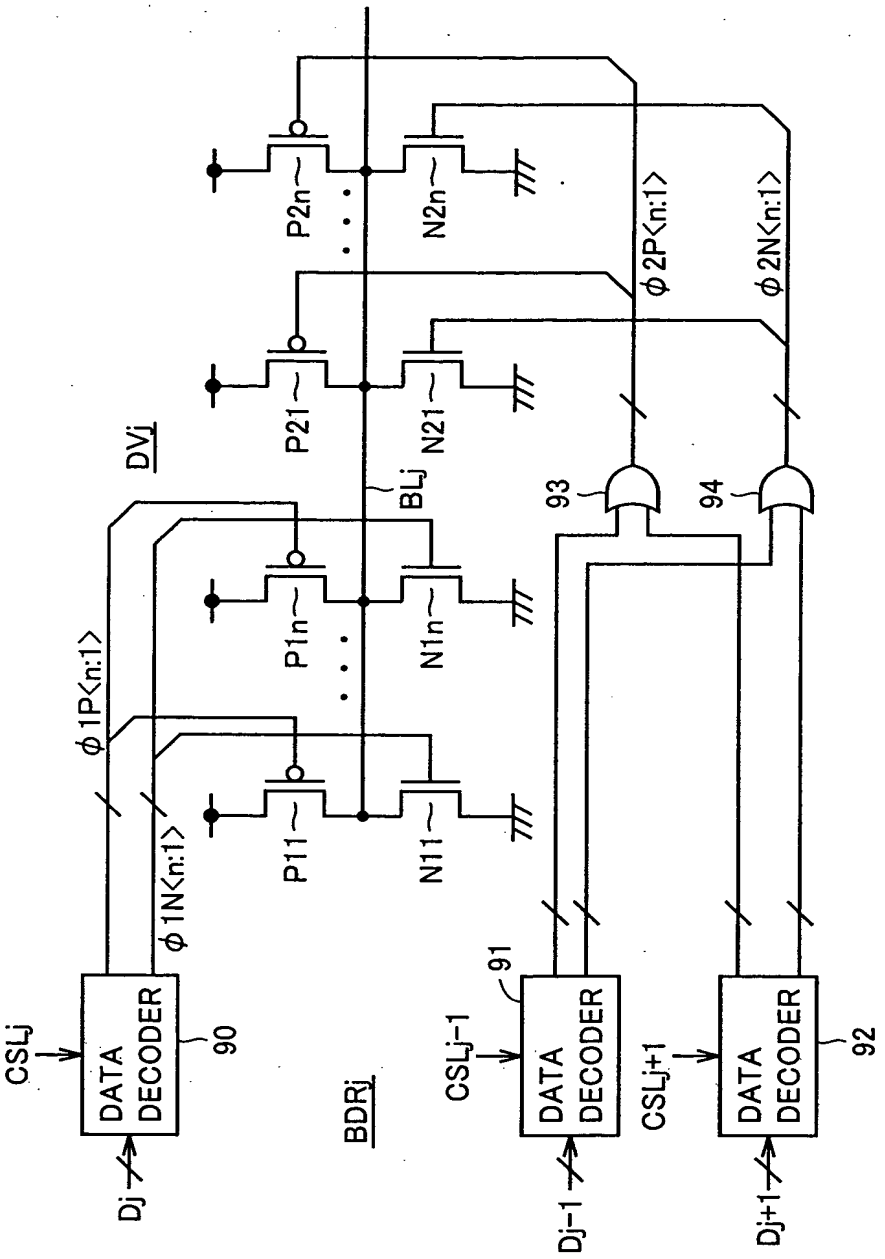

CORRESPONDING TO CSLj-1 AND WDj-1
CORRESPONDING TO CSLj AND WDj
P4
P3
60R
φ1PR
BLj
WDj
P1
DVRj
61R
φ1NR
ZWDj
N4
N3
N1
80R
CSLj-1
CSLj+1
WDj-1
82R
81R
WDj+1
φ3PR
CSLj-1
ZWDj-1
84R
83R
φ3NR
CSLj-1
WDj-1
85R
φ4PR
CSLj+1
ZWDj+1
86R
φ4NR
CSLj+1
WDj+1
BDRRj
CORRESPONDING TO CSLj+1 AND WDj+1

FIG.22

CSLj-1	CSLj+1	WDj-1	WDj+1	ϕ3PR	ϕ3NR	ϕ4PR	ϕ4NR	BLj CURRENT
L	L	-	-	H	L	H	L	0
L	H	-	H	H	L	H	H	$\Delta IW \rightarrow$
L	H	-	L	H	L	L	L	$\Delta IW \leftarrow$
H	L	L	-	L	L	H	L	$\Delta IW \leftarrow$
H	L	H	-	H	H	H	L	$\Delta IW \rightarrow$
H	H	L	L	L	L	L	L	$2 \cdot \Delta IW \leftarrow$
H	H	L	H	H	L	H	L	0
H	H	H	L	H	L	H	L	0
H	H	H	H	H	H	H	H	$2 \cdot \Delta IW \rightarrow$

FIG.23


CSLj
DATA DECODER
90
Dj
φ1P<n:1>
φ1N<n:1>
DVj
P11
P1n
N11
N1n
BLj
BDRj
P21
P2n
N21
N2n
φ2P<n:1>
φ2N<n:1>
93
94
91
CSLj-1
DATA DECODER
Dj-1
CSLj+1
DATA DECODER
92
Dj+1